Model Name and Version: MiniCAM 2001 (the Mini-Climate Assessment Model).

Model Type: Partial-equilibrium model (energy and land-use) including numerous energy supply technologies, agriculture and land-use model, and a reduced-form climate model. Emissions include CO_2, CH_4, N_2O, and SO_2.

Developer/Home Institution: Joint Global Change Research Institute (PNNL). Contacts: Sonny Kim (skim@pnl.gov) or Steve Smith (ssmith@pnl.gov).

Sector Detail: Three end-use sectors (Buildings, Industry, Transportation). Supply sectors: fossil-fuels, biomass (traditional & modern), electricity, hydrogen, synfuels.

Regional Detail: Global coverage with 14 regions (United States, Canada, Western Europe, Japan, Australia & New Zealand, Former Soviet Union, Eastern Europe, Latin America, Africa, Middle East, China [& Asian Reforming Economies], India, South Korea, Rest of South & East Asia)

Technology Detail: Electric generation (Coal, Oil, Gas, Biomass, Hydro, Fuel Cells, Nuclear, Wind, Solar PV, Solar-Wind Storage, Space Solar PV), Hydrogen production (Coal, Oil, Gas, Biomass, Electrolysis), synthetic fuels (liquids and gases from coal, oil, gas [gas→liquid only], biomass), geologic carbon sequestration from fossil fuels (electric generation, hydrogen generation, synthetic fuel production). Commercial biomass supply generated regionally by an Agriculture and Land Use (AgLU) model.

Time Period: The model run period is 1990 – 2095 in 15 year time steps.

Special Features: Ability to understand the impact of technologies and policies related to GHG emissions in a national and global context. Ability to analyze the impacts of policies over a 100 year time frame. Ability to quickly evaluate technologies including carbon sequestration. Biomass land competes with food and fiber uses in the AgLU model. MAGICC provides GHG concentrations, radiative forcing, and climate change (including regional climate change through use of SCENGEN).

Treatment of Renewable Energy: Includes solar PV, wind, hydroelectric (including geothermal), biomass (two separate supply streams: traditional/ waste biomass and grown biomass from dedicated farms), storage technologies for solar and wind, and space-satellite solar. Wind and solar costs are input as exogenous parameters by time period and by region. Intermittence of solar and wind is represented by placing limits on maximum penetration within any region's end-use electricity market. Hydroelectric is resource constrained by region. Biomass from dedicated farms is derived from the model's Agriculture and Land Use module, in which biomass crops compete for acreage with food crops. Transmission is not modeled specifically other than the specification of transmission costs.

Major Users/Applications: The US EPA is one the major users of the MiniCAM and has employed it to analyze various policies to address climate change. The MiniCAM has been widely used in international energy modeling, in venues such as the Intergovernmental Panel on Climate Change (IPCC) and the Stanford Energy Modeling Forum (EMF). MiniCAM developers are among the lead authors of the IPCC's Special Report on Emission Scenarios (SRES).

Documentation: Brenkert et al. (2003), Edmonds and Reilly (1985) and Edmonds et al. (1997).

Brenkert, A. et al. (2003) MiniCAM Model Documentation in preparation (available mid-2003)

Edmonds, J., and J. Reilly (1985) *Global Energy: Assessing the Future* (Oxford University Press, New York)

Edmonds, J., M. Wise, H. Pitcher, R. Richels, T. Wigley, and C. MacCracken. (1997) "An Integrated Assessment of Climate Change and the Accelerated Introduction of Advanced Energy Technologies," *Mitigation and Adaptation Strategies for Global Change*